

ABSTRACT

5 A power control interface between an unstable power source such as a wind farm  
and a power transmission line employs an electrical energy storage, control system, and electronic  
compensation module which act together like an “electronic shock absorber” for storing excess  
power during periods of increased power generation and releasing stored energy during periods of  
decreased power generation due to wind fluctuations. The control system is provided with a “look  
ahead” capability for predicting power output (wind speed conditions) and maintaining energy  
10 storage or release over a “narrow-band” range despite short duration fluctuations. The control  
system uses data derived from monitoring the wind farm power output and the power transmission  
line, and employs system-modeling algorithms to predict narrow-band wind speed conditions. The  
power control interface can also use its energy storage capacity to provide voltage support at the  
point of injection into the power transmission system, as well as fault clearance capability for  
15 “riding out” transient fault conditions occurring on the power transmission line.